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<p>7E7081</p> <p>B. Tech. VII Sem. (Main / Back) Exam., Nov. – Dec. - 2018</p> <p>Electronics & Communication Engineering</p> <p>7EC1A Antenna & Wave Propagation</p>		

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

UNIT-I

- Q.1 (a) Explain the following terms – [8]
- (i) Polarization
 - (ii) Antenna Temperature
 - (iii) Isotropic Radiator
 - (iv) Gain of an Antenna
- (b) Derive an expression of Radiated power and Radiation Resistance of a Hertzian dipole. [8]

OR

- Q.1 (a) Describe the Beam width and Directivity of an Antenna. [8]
- (b) A thin dipole antenna is $\frac{l}{15}$ long. If its loss resistance is 1.5Ω , find radiation resistance and efficiency. [8]

UNIT- II

- Q.2 (a) Calculate the field strength of a uniform linear array. [8]
- (b) What is multiplication of patterns? Example with suitable examples. [8]

OR

- Q.2 (a) Prove that the directivity of an end-Fire array of the point source spaced at a distance apart is given by – [8]

$$D(\theta) = \frac{2}{1 + \frac{\sin 2\beta d}{2\beta d}}$$

- (b) If the phase difference $\delta = -90^\circ$, A uniform linear array consists of 16 isotropic point sources with a spacing of $\frac{\lambda}{4}$, calculate: [8]
- (i) Directivity
- (ii) Effective aperture

UNIT- III

- Q.3 (a) Write short notes on Yagi – Uda antenna and Helical antenna. [8]
- (b) Briefly explain Microstrip patch antenna and reflector antenna. [8]

OR

- Q.3 (a) Explain the method of Antenna Radiation Pattern measurements. [8]
- (b) Explain the working of a folded dipole antenna. [4]
- (c) What are the different types of antennas used at very high frequencies? [4]

UNIT- IV

- Q.4 (a) Explain the mechanism of Radio wave propagation. [8]
- (b) What do you understand by Duct propagation? How are ducts formed? What are its merits and demerits? [8]

OR

- Q.4 (a) What is Tropospheric scattering? What are the frequency range for it? [4]
- (b) What are the factors affecting space wave field strength? [4]
- (c) Derive an expression of field strength due to space wave. [8]

UNIT- V

- Q.5 (a) Derive the expression for the Refractive Index of the Ionosphere. [8]
- (b) Discuss the characteristics of different ionosphere layers in brief. [8]

OR

- Q.5 (a) Explain the effect of Faraday rotation and Earth's magnetic field on Ionospheric wave propagation. [8]
- (b) Explain the following in brief – [8]
- (i) Skip distance
 - (ii) MUF
 - (iii) Virtual height
 - (iv) Critical Frequency